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## MYTHS IN ANIMAL PSYCHOLOGY.

THE life-histories of animals, from the primordial germ-cell to the end of the life-cycle ; their daily, periodical, and seasonal routines ; their habits, instincts, intelligence, and peculiarities of behavior under varying conditions ; their geographical distribution, genetic relations and oecological interrelations ; their physiological activities, individually and collectively ; their variations, adaptations, breeding and crossing,—in short, the *biology* of animals, is beginning to take its place beside the more strictly morphological studies which have so long monopolised the attention of naturalists. The revival of interest in general life-phenomena, and especially in the psychical activities of animals, takes its date from Darwin's epoch-making work. The phenomenal insight which this great naturalist brought to the study of animal instinct and intelligence illuminated the whole subject and prepared the way for the development of a new science, commonly designated “Animal Intelligence ; or, Comparative Psychology.” That mind and body must have been evolved together and under the same natural laws was the conclusion destined to become the corner-stone, not only of biology, but also of rational psychology.

Darwin's views triumphed, as all the world knows ; but while his ideas have been generally accepted, his method, the real secret of his success, has had too few followers. Darwin's method was to prepare himself for his problem by long-continued and close examination of all its details and bearings. He was no hustler on the jump for notoriety, no rapid-fire writer ; but a cool, patient, indefatigable investigator, counting not the years devoted to prelim-

inary work, but weighing rather the facts collected by his tireless industry, and testing his thoughts and inferences over and over again, until well-assured that they would stand. Such a method was altogether too laborious and searching to be imitated by students ambitious to reach the heights of comparative psychology through a few hours of parlor diversion with caged animals, or by a few experiments on domestic animals. We are too apt to measure the road and count the steps beforehand. Darwin allowed the subject itself to settle all such matters, while he forgot time in complete absorption with his theme. Neglect of Darwin's example in this respect has been unfortunate for both general animal biology and the coming science of comparative psychology. An examination of a few typical cases in recent literature may help make us more heedful of Darwin's example, and more reserved in announcing observations and conclusions which have not passed through the furnace of verification and repeated revision.

One such case<sup>1</sup> is furnished in a recent volume on *Animal Intelligence*, by Mr. Wesley Mills of McGill University. It is a case of

#### ALLEGED FEIGNING IN SQUIRRELS.

As the subject of feigning is one of great interest, as the method of treatment is especially instructive from the point of view before defined, and as the observations are presented as a contribution to comparative psychology, the case is entitled to special attention, and I shall, therefore, make it the leading subject for examination. The author stimulates interest in his communications by announcing that they give two examples in which feigning was strikingly manifested; and in another place he speaks of them as among the most typical cases of such behavior ever recorded.

After reading these observations through and through with care and in the full expectation of finding every promise fulfilled, I have to confess my inability to discover any satisfactory evidence

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<sup>1</sup> The selection of this case, it may be hardly necessary to say, was due to its nature and fitness for the purpose in view. It would not be fair to judge of the book as a whole from this small part. The book contains much interesting matter and will doubtless be widely read as it deserves.

of feigning. Naturally, I am disappointed and surprised, and all the more so as it seems to me that Mr. Mills himself must be credited with all the feigning he has ascribed to his two chickarees; that is to say, the supposed feigning is a misinterpretation. Whether I am correct or not, an examination of Mr. Mills's observations cannot fail to be of interest. The subject of animal intelligence has scarcely yet emerged from the mythical state, and no part of the subject is in a more hopeless tangle of misinterpretation than the so-called feigning of animals. It must be said to the credit of Mr. Mills that he has kept his observations apart from his interpretations, and he has thus made it possible for the reader to draw his own conclusions.

A few instances to illustrate how easily people allow themselves to be misled in regard to animal intelligence and to draw conclusions from evidence supplied largely or wholly from the imagination, may put us in a more cautious frame of mind for interpreting the behavior of Mr. Mill's squirrels.

*A Horse Protects His Master from the Tusks of a Savage Boar.*

“George Howard, nineteen years of age, who has been employed on the farm of George Lent, about a mile outside of the city on the Buffalo road, is at the Homeopathic Hospital, suffering from injuries inflicted on him by a hog. That young Howard is not a subject for the coroner instead of the hospital surgeon is due to the fact that a horse which has been a great favorite of Howard and is greatly attached to the boy, kicked the enraged hog away as the brute was about to fasten its teeth in the boy's throat. The horse has always been looked upon by Farmer Lent as a remarkably intelligent member of the equine family, but he is now considered a wonder, and had the farmer not himself witnessed the act of the horse, he would never have believed that an animal could display such intelligence.

“The hog which made the attack on Howard was a large and particularly ugly brute. He broke out of his pen yesterday afternoon, and made a rush for the barn. The door was open and young Howard, who had just placed his favorite horse back into his stall

after a careful grooming, was just starting to go out of the door when the enraged hog entered with a rush. The brute made a savage attack on the boy, and, fastening his teeth on the calf of the leg, tore and lacerated the flesh. Howard fell back into the stall and close to the feet of the horse he had just groomed.

“The hog was springing at the throat of his prostrate victim when the horse raised his hind feet and gave the hog a kick which sent him ten feet and caused him to squeal with pain. Mr. Lent, who had been attracted by the screams of the boy, was just entering the barn door as he saw the horse kick the hog off the prostrate body of the boy.”

This account from the *Rochester Union and Advertiser* appears to be entirely reliable, so far as the circumstances are concerned; but these, it will be seen, do not justify the conclusion that the horse kicked the hog in order to protect the boy. The hog was probably kicked without a thought of the boy. The fright of the horse would cause it to kick in its own defence, and we are thus left without the slightest evidence of any altruistic motive in the act.

#### *Story of the Dog-Fish (*Amia Calva*) and Its Young.*

The following statement is taken from George Brown Goode's *Natural History of Useful Aquatic Animals* (pp. 659-660). It is a quotation from Dr. Estes, but Mr. Goode indorses it as a part of “the best description of the habits of the fish.”

Dr. Estes says:

“I come now to mention a peculiar habit of this fish, no account of which I have ever seen. It is this: While the parent still remains with the young, if the family become suddenly alarmed, the capacious mouth of the old fish will open, and *in rushes the entire host of little ones; the ugly maw is at once closed, and off she rushes to a place of security, when again the little captives are set at liberty.* If others are conversant with the above facts, I shall be very glad; if not, shall feel chagrined for not making them known long ago.”

It is true that the old fish (the male) will sometimes open wide his mouth when approached, as if threatening an attack. It is also true that the swarm of young will suddenly disappear at any

slight disturbance in the water, and after an interval of some minutes of quiet reappear at or near the place of disappearance.

At the moment of alarm and disappearance of the young, the old fish rushes off a short distance, stirring up the mud as he leaves. If the observer keeps perfectly quiet for some minutes, the parent fish may often be seen returning very slowly and cautiously so as not to be seen. Soon after he reaches the place in which the young are concealed at the bottom, they begin to gather about him and renew their feeding on small aquatic animals abundant in the grass along the shore.

Dr. Estes had seen the old fish open its mouth, and the young disappear as the fish dashed away. He had seen the young again with the parent fish, not far from where they were first observed. He did not take the trouble to find out how the young escaped from sight, and jumped at the conclusion that they had taken refuge in the mouth of the old fish. What a wonderful tale, and how strange that a conscientious observer could so completely humbug himself! Now this is no exceptional case; it is one of the most common occurrences, and that, too, even among men of high standing in science.

Let us now take an example from the comparative psychologist, who always has on hand an unlimited supply of this kind of material.

#### *The Story of the Insane Pigeon.*

This story, which is taken from *The Mental Evolution of Animals* (p. 173) by Mr. Romanes, has been thought worthy of translation into German by Karl Gross in his *Spiele der Thiere*. The case was reported to Mr. Romanes by a lady, and is given in her own words:

“A white fantail pigeon lived with his family in a pigeon-house in our stable-yard. He and his wife had been brought originally from Sussex, and had lived, respected and admired, to see their children of the third generation, when he suddenly became the victim of the infatuation I am about to describe.

“No eccentricity whatever was remarked in his conduct until

one day I chanced to pick up somewhere in the garden a ginger-beer bottle of the ordinary brown-stone description. I flung it into the yard, where it fell immediately below the pigeon-house. That instant down flew paterfamilias and to my no small astonishment commenced a series of genuflections, evidently doing homage to the bottle. He strutted round and round it, bowing and scraping and cooing and performing the most ludicrous antics I ever beheld on the part of an enamored pigeon. . . . Nor did he cease these performances until we removed the bottle; and, which proved that this singular aberration of instinct had become a fixed delusion, whenever the bottle was thrown or placed in the yard—no matter whether it lay horizontally or was placed upright—the same ridiculous scene was enacted; at that moment the pigeon came flying down with quite as great alacrity as when his peas were thrown out for his dinner, to continue his antics as long as the bottle remained there. Sometimes this would go on for hours, the other members of his family treating his movements with the most contemptuous indifference, and taking no notice whatever of the bottle. At last it became the regular amusement with which we entertained our visitors to see this erratic pigeon making love to the interesting object of his affections, and it was an entertainment which never failed, throughout that summer at least. Before next summer came round, he was no more."

Mr. Romanes remarks:

"It is thus evident that the pigeon was affected with some strong and persistent monomania with regard to this particular object. Although it is well known that insanity is not an uncommon thing among animals, this is the only case I have met with of a conspicuous derangement of the instinctive as distinguished from the rational faculties,—unless we so regard the exhibitions of erotomania, infanticide, mania, etc., which occur in animals perhaps more frequently than they do in man."

This pigeon, whose behavior has given it so wide fame as a case of deranged instinct, was undoubtedly a perfectly normal bird; and had Mr. Romanes been familiar with the antics of male pigeons, he would have found nothing in the performances to indicate in-

sanity. I have seen a white fantail play in the same way to his shadow on the floor, and when his shadow fell on a crust of bread he at once adopted the bread as the object of his affection, and went through all the performances described by the lady, even to repeating the behaviour for several days afterward when I placed the same piece of bread on the floor of his pen. If one is looking for insanity in pigeons, let him first know the normal range of sanity, and pay little heed to stories of inexperienced observers who are apt to overlook circumstances essential to a correct understanding of what they report.

It is not improbable that the lady's amusing pigeon at first took the bottle for a living intruder upon his ground, and flew down to it for the purpose of driving it off. Finding it at rest, if his shadow fell upon it, or if his image was even faintly reflected from its surface, he would readily mistake it for a female pigeon, and after once getting this idea and performing before it, the bottle would be remembered and the same emotions excited the next time it was presented. The only value this suggestion can have is, that it is based on a similar case. The lady's observations were incomplete at the critical moment, i. e., at the time of the *first* performance, and it is too late to mend the failure.

The essentials to understanding any peculiar case of animal behavior are almost invariably overlooked by inexperienced observers, and the best trained biologist is liable to the same oversight, especially if the habits of the animal are not familiar. The qualification absolutely indispensable to reliable diagnosis of an animal's conduct is an intimate acquaintance with the creature's normal life, its habits and instincts. Little can be expected in this most important field of comparative psychology until investigators realise that such qualification is not furnished by parlor psychology. It means nothing less than years of close study,—the long-continued, patient observation, experiment, and reflexion, best exemplified in Darwin's work.

Let us now examine

TWO CASES OF SUPPOSED FEIGNING IN SQUIRRELS, AS  
REPORTED BY MR. MILLS.*Case I. (Pp. 61-62.)*

“I was standing near a tree in which a red squirrel had taken up a position, when a stone thrown into the tree was followed by the fall of the squirrel. I am unable to say whether the squirrel was himself struck, whether he was merely shaken off, or how to account exactly for the creature’s falling to the ground. Running to the spot as quickly as possible, I found the animal lying apparently lifeless. On taking him up, I observed not the slightest sign of external injury. He twitched a little as I carried him away and placed him in a box lined with tin, and having small wooden slats over the top, through the intervals of which food might be conveyed. After lying a considerable time on his side, but breathing regularly, and quite free from any sort of spasms such as might follow injury to the nervous centres, it was noticed that his eyes were open, and that when they were touched winking followed. Determined to watch the progress of events, I noticed that in about an hour’s time the animal was upon his feet, but that he kept exceedingly quiet. The next day he was very dull—ill, as I thought, —and I was inclined to the belief, from the way he moved, that possibly one side was partially paralysed; but finding that he had eaten a good deal of what had been given him (oats), I began to be suspicious. Notwithstanding this apparent injury, that very day, when showing a friend the animal, on lifting aside one of the slats a little, he made such a rush for the opening that he all but escaped. On the third day after his capture, having left for a period of about two hours the sittingroom (usually occupied by two others besides myself) in which he was kept, I was told, on my return, by a maid-servant and a boy employed about the house, that some time previously the squirrel had escaped by the window, and, descending the wall of the house, which was ‘rough-cast,’ he had run off briskly along a neighboring fence, and disappeared at the root of a tree. When asked if they saw any evidence of lameness, they

laughed at the idea, after his recent performances before their eyes. For several days I observed a squirrel running about, apparently quite well, in the quarter in which my animal had escaped, and I feel satisfied that it was the squirrel that I had recently had in confinement, but, of course, of this I cannot be certain.

"I believe, now, that this was a case of feigning, for if the injury had been so serious as the first symptoms would imply, or if there had been real paralysis, it could not have disappeared so suddenly. An animal even partially paralysed, could scarcely have escaped as he did and show no sign of lameness. His apparent insensibility at first may have been due to catalepsy or slight stunning. But while there are elements of doubt in this first case, there are none such in that about to be described."

Substantially the case is as follows:

1. A stone was thrown at a red squirrel in a tree, the animal fell to the ground apparently lifeless, there was no mark of external injury, but the squirrel *twitched* a little when taken up; it was placed in a box, where it lay upon its side, breathing regularly; after some time it was noticed that the eyes were open, and that winking resulted from touching.

If the squirrel was stunned, as seems probable, the behavior so far would not indicate feigning, so far as I can see.

2. In about an hour's time, the animal was found upon its feet, but it kept quiet; the next day the squirrel looked dull, but *moved as if injured in one side*; it had eaten oats.

I see nothing in all this to raise the "suspicion" that the injury was unreal and feigned.

3. This same day the squirrel tried to escape, when alarmed by the lifting of a slat.

Surely nothing surprising in a wild squirrel well enough to eat, even if it was still suffering from an injury.

4. On the third day after capture, according to testimony of servants, the squirrel escaped through an open window, ran off briskly along a fence, and disappeared at the root of a tree. Servants noticed no lameness.

An animal well enough to make a vigorous dash for liberty the

day before, might well escape in the manner described. The servants' testimony as to the absence of lameness amounts to nothing. The squirrel subsequently seen by Mr. Mills, running about, "apparently quite well," may or may not have been the one he lost. Observe that Mr. Mills does not *know* whether the squirrel was injured or not. There was an appearance of injury and every reason to believe it was real, yet the cause of the injury, if real, and its nature and extent were not definitely known. Mr. Mills asserts that, *if* the injury had been as serious as the first symptoms *implied*, it *could* not have disappeared *so suddenly*. There are too many unknown elements for any positive conclusion. We do not know that the lameness had entirely disappeared at the time of escape; and if it had, there would not seem to have been any remarkable suddenness after three days' convalescence.

In this case nearly every point of critical importance was undetermined, and the author seems to be too little familiar with squirrel behavior.

The second case is claimed to be free from any element of doubt. "A more typical case of feigning than this one," says Mr. Mills, "could scarcely be found."

"A Chickaree was felled from a small tree by a gentle tap with a piece of lathing. He was so little injured that he would have escaped, had I not been on the spot where he fell and seized him at once. He was placed forthwith in the box that the other animal had occupied. He manifested no signs whatever of traumatic injury. One looking in upon him might suppose that here was a case of a lively squirrel being unwell, but events proved otherwise. He ate the food placed within the box, but only when no one was observant. He kept his head somewhat down, and seemed indifferent to everything. When a stick was placed near his mouth he savagely bit at it; but when a needle on the end of the same stick was substituted he evinced no such hostility. He made no effort to escape while we were in the room, but on our going down to dinner he must at once have commenced work, for on returning to the room in half an hour he was found free, having gnawed one of the slats sufficiently to allow him to squeeze through. With the assistance

of a friend he was recaptured, but during the chase he showed fight when cornered, and finally, as he was being secured, I narrowly escaped being bitten. He was returned to his box which was then covered with a board weighted with a large stone. Notwithstanding, he gnawed his way out through the upper corner of the box during our absence on one occasion shortly afterwards.

"I think a more typical case of feigning than this one could scarcely be found."

The essentials are as follows:

1. A Chickaree, knocked from a tree with a piece of lathing, was captured and caged as before. Why, "one looking in upon him might suppose that there was a case of a lively squirrel *unwell*," is not explained. A very important point, but with no more information, we are unable to judge whether the squirrel was feigning or Mr. Mills imagining. If the animal was merely quiet through fear, as seems most probable from there being no further description, who that is familiar with squirrels would have surmised that it was feigning sick?

2. The squirrel did not eat when one was watching it. Perfectly natural. Fear would prevent.

3. It kept its head "somewhat down," and seemed indifferent, but when a stick was placed near its mouth it bit at it savagely. Mr. Mills seems to regard this as evidence of feigning indifference or sickness. If such behavior is feigning, Mr. Mills is a true discoverer.

4. The squirrel made no effort to escape while Mr. Mills was present, but did get free when left alone for half an hour at dinner-time. Such evidence of feigning has a decidedly entertaining side, to say the last. The squirrel seems to be the cleverer fellow every time, for he is serious while the observer thinks he is fooling. Who has not seen a squirrel hide behind a branch of the trunk of a tree to escape being seen by a person approaching? Is keeping *quiet* under such circumstances *feigning* quiet? If a confined squirrel, alarmed at our presence, sits still while we are watching him, but tries to get free when left alone, is there any deception in his behavior except what we ourselves invent?

5. The squirrel was recaptured, but showed fight when cornered, and Mr. Mills narrowly escaped being bitten. *Mirabile dictu!* A good bite would have been the best feint of all. Mr. Mills's good luck was an untold loss to comparative psychology.

6. "The squirrel was returned to its box, and a board weightea with a large stone placed over it. Notwithstanding he gnawed his way out through the upper corner of the box during our absence on one occasion shortly afterwards."

A large stone on a board to keep the animal in, can only be taken as another feint on the part of Mr. Mills, for of course he did not expect thus to prevent gnawing out. The size of the stone did not fool the squirrel, whoever else was taken in.

Further, on p. 71, Mr. Mills comes to the question of what is essential to feigning death or injury. "It is to be remembered," says the author, "that in these cases the animal simply remains as quiet and passive as possible. . . . It is within the observation of all that a cat watching near a rat-hole, feigns quiet. . . . A great part of the whole difficulty, it seems to me, has arisen from the use of the expression 'feigning death.' What is assumed is *inactivity* and *passivity*, more or less complete. This, of course, bears a certain degree of resemblance to death itself."

Darwin carefully compared the appearance of death-feigning insects and spiders with that of the really dead animals, and the result was, as he says, "that in no one instance was the attitude exactly the same, and in several instances the attitude of the feigners and of the really dead were as unlike as they possibly could be." (See Appendix to Romanes's *Mental Evolution in Animals*, p. 364.)

Romanes (p. 308) states this result in less cautious language: "All that 'shamming dead' amounts to in these animals is an instinct to remain motionless, and thus inconspicuous, in the presence of enemies."

Mr. Mills makes the conclusion still broader, assuming that the *essential* thing in feigning is *quiet*. That, even in the case of insects, quiet is not the distinctive character of feigning seems evident when we remember that the non-feigning state may be one of as

perfect quiet as that of the feigning state. The mere passivity does not of itself discriminate between these two very different states; in other words, it does not give us the criterion of either state. The essential thing is not a non-differential element, common to the two states. The "essential" must give us the difference, and enable us to distinguish clearly between the normal state of rest and the so-called feigned condition. The quiet of an animal at rest and that of the same animal feigning death, are two very different things; otherwise we should have no use for the term "feigning" as a means of distinction. In one case the quiet is perfectly normal and signifies only a state of rest; in the other it means an *assumed* or *induced* condition, as the result of disturbance and alarm.

The cause, the conscious purpose or the blind adaptation, and the external appearances are all essentially unlike in the two cases. Look at the beetle at rest on the branch or leaf of a tree, and at the same beetle after it has dropped to the ground, alarmed by some unusual jar, lying as it fell, motionless, on its side or back. Is the quiet now the same as before? or is it as different as calm unheeding composure and the stupor of terror, or the stillness deliberately maintained to escape discovery? Whether cataleptic or voluntary, the so-called feigned quiet has no fundamental likeness with the quiet of normal rest. There is only a deceptive outward semblance, which speedily vanishes on closer comparison.

In the quiet of a cat before a rat-hole, we have quite a different phenomenon, and one to which the term feigning seems to me to have no legitimate application. There is no fear, no involuntary suspension of activity, no attempt to imitate a state of death, or to falsify appearances in order to escape enemies. The quiet is deliberately maintained, not on account of alarm, but to avoid giving alarm to her intended victim; not to elude but to capture, the rat. The cat is not surprised, but she hopes to surprise the rat. She has the same end in view when she stalks a bird, keeping behind some intervening object that hides her from view. Here the cat is in motion and glides on with manifest satisfaction in her advantage; and if she is feigning, she is certainly not feigning quiet. It must be evident, I think, that if feigning does not properly char-

acterise the *action* of the cat in this case, it cannot properly define the *inaction* in the other.

Returning to his "feigning squirrels" (p. 72), Mr. Mills tells us more explicitly what he understands by feigning in their case.

"These little animals were naturally led, under the unwonted circumstances of their confinement, to disguise, in an extraordinary degree, their real condition, and even to imitate an unusual and unreal one. The mental process is a complex of instinct pure and simple, with higher intellectual factors added, and the cases of these squirrels, thus feigning, are among the clearest that, so far as I am aware, have ever been recorded."

This leaves no doubt that Mr. Mills believes he saw something more than feigning quiet in his squirrels. "*Disguise of the real and imitation of the unreal,*" is what Mr. Mills claims to have seen, and what I have failed to find any satisfactory evidence of in the reports he has given. In fact, the observations seem to me to indicate no feigning at all on the part of the squirrels, and to show very clearly that Mr. Mills failed to get reliable data at just the most critical points. It is the old failure of anecdote psychology.

If it be true, as I think will be generally admitted, that comparative psychology is a science of the future; and if at present it is only a part of general biology, it follows that any attempt to soar to "the nature and development of animal intelligence," except through the aid of long schooling in the study of animal life, is doomed to be an Icarian flight.

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